# INFLUENCE OF SEEDING DENSITY ON QUANTITATIVE MEASUREMENTS OF WINTER RAPE IN CLIMATIC CONDITIONS FROM SCDA LOVRIN

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**ABSTRACT**
Plant height is strongly influenced by seeding density, in Pamela variety and Exotic and PR46W14 hybrids it increases from 50 g.s./m² to 150 g.s./m², then fades and tends to decrease.
The average number of branches varies from 12.6 at PR46W14 hybrid to 28.87 at Extend hybrid at the density of 50 g.s./m².
Increasing the seeding density and implicitly the plant density over 100 g.s./m² reduces the number of main branches per plant. It should be noted that higher densities of seeding stimulates the formation of main branches per plant.
Number of main branches per plant varies between 3.23 in PR46W14 hybrid at a density of 50 g.s./m² to 5.57 in Exotic hybrid at a density of 100 g.s./m².
Number of secondary branches per plant has maximum values at 50 g.s./m² in Extend hybrid.
Average number of capsules per plant has values between 140.87 in PR46W14 hybrid and 415.17 in Extend hybrid.

**Keywords:** rape, plant height, branches, capsules

## INTRODUCTION

Rape is currently one of the world's most important oil species. Seed oil has many industrial uses, with a significant share in feeding people. (BÎLTEANU, 1969; BÎLTEANU, 2001)
Density is an essential element in rape production. It strongly influences maturity uniformity of capsules and seeds (STAN, 1998, TABARA, 2005).
A plant can form up to 800 capsules (BÎLTEANU ET AL., 1991, MUNTEAN ET AL., 2001).
Density correlates with the distance between rows, with the time of sowing and soil conditions (SOLTNER, 1986) and influences the productivity elements.
BÎLTEANU ET AL. in 1991 describes some characteristics of rapeseed varieties grown in Romania: plant height between 125-130 cm, the average number of branches 10-12 and the average number of capsules/plant between 92-95.

## MATERIAL AND METHOD

Research is carried out at S.C.D.A. Lovrin in 2011 in a bifactorial experience, placed in randomized blocks. Factors were:
A factor. Rape varieties and hybrids with four graduations. Varieties and hybrids used have different origins: $a_1$ - Pamela; $a_2$ – Extend; $a_3$ – Exotic; $a_4$ - PR46W14.
B factor. Seeding densities with four graduations: $b_1$ - 50 g.s./m², $b_2$ - 100 g.s./m²; $b_3$ - 150 g.s./m², $b_4$ - 200 g.s./m².
Seeding time was the first half of the first decade of October. The used agrofond was $N_{90}P_{90}K_{90}$, the other technology elements are the ones specific to the area.

The experimental results were calculated and interpreted by specific methods of experimental technique.
Were determined: stem length, number of branches of which main and secondary, number of capsules per plant.

## RESULTS

*Table 1*. shows the variation of plant height in the four rape cultivars in 2011 according to density.
The bigger plant density of Pamela variety in 2011 conditions, increases the stem length up to 150 g.s./m².
In the case of Extend rapeseed hybrid, the average length of plants is reduced from 135.93 cm at the density of 50 g.s./m² to 131.83 cm in the case of a seeding density of 200 g.s./m².
In the case of Exotic hybrid is found that plant height is strongly influenced by seeding density, the highest average length of plant stem is achieved at a density of 100 g.s./m² (146.8 cm), 17.7 cm above the average plant height obtained at a density of 50 g.s./m².
In PR46W14 hybrid, the stem length has maximum values when PR46W14 hybrid is sown at a density of 100 g.s./m² (132.5 cm).

**Table 1. Average plant height in four rapeseed cultivars in 2011**

| Cultivar | 50 g.s/m$^2$ | 100 g.s./m$^2$ | 150 g.s./m$^2$ | 200 g.s./m$^2$ |
|---|---|---|---|---|
| **Pamela** | 125.73 | 128.56 | 129.60 | 128.80 |
| **Extend** | 135.93 | 134.60 | 132.56 | 131.83 |
| **Exotic** | 129.10 | 146.80 | 143.07 | 133.10 |
| **PR46W14** | 121.20 | 132.50 | 130.73 | 121.57 |

Variation of the average number of total branches/plant in four rapeseed cultivars in 2011 is shown in *Table 2*.
In Pamela variety, the maximum number of branches per plant is realized in variants that were sown at 150 g.s./m² (26 branches). It should be noted that, at higher seeding densities, the number of branches increased from that made in variants sown with 50 g.s./m².
In the case of Extend hybrid, the highest degree of branching is obtained by sowing at a density of 50 g.s./m². Increasing density, the number of branches is reduced.

**Table 2. The average number of total branches/plant in the four rapeseed cultivars in 2011 under the influence of seeding density**

| Cultivar | 50 g.s./m$^2$ | 100 g.s./m$^2$ | 150 g.s./m$^2$ | 200 g.s./m$^2$ |
|---|---|---|---|---|
| **Pamela** | 14.00 | 15.63 | 26.00 | 19.33 |
| **Extend** | 28.87 | 22.87 | 20.33 | 15.60 |
| **Exotic** | 21.70 | 23.00 | 24.50 | 24.73 |
| **PR46W14** | 12.60 | 27.03 | 25.00 | 20.67 |

Unlike the hybrids previously analyzed in terms of number of branches, in Exotic hybrid the highest number of branches is obtained in variants sown with a large number of germinable seeds per square meter, 24.5 branches/plant at the density of 150 g.s./m² and 24.73 branches per plant at a density of 200 g.s./m².
The highest number of branches per plant in PR46W14 hybrid is realized in the version sown with 100 g.s./m², 27.03 branches per plant.

Number of main branches in the four cultivars in 2011 is presented in *Table 3*.
Data analysis highlights the fact that with increasing plant density at Pamela variety, number of main branches increases.
In Extend hybrid main branch number per plant tends to decrease with increasing seeding density.
In Exotic hybrid, the highest number of main branches is realized at the density of 100 g.s./m² density, 5.57 compared to only 4.77 main ramifications on plant at the density of 50 g.s./m². It is worth noting that higher densities of seeding stimulates the formation of primary branches per plant only in some cultivars.
And in the case of PR46W14 hybrid it if found that a higher density of seeding stimulates the formation of primary branches per plant.

**Table 3. The average number of primary branches/plant in the four rapeseed cultivars in 2011**

| Cultivar | 50 g.s./m$^2$ | 100 g.s./m$^2$ | 150 g.s./m$^2$ | 200 g.s./m$^2$ |
|---|---|---|---|---|
| **Pamela** | 4.73 | 4.80 | 5.20 | 5.30 |
| **Extend** | 5.50 | 5.43 | 5.40 | 4.77 |
| **Exotic** | 4.77 | 5.57 | 5.43 | 5.30 |
| **PR46W14** | 3.23 | 4.93 | 5.37 | 5.30 |

Average number of secondary branches realized under the influence of seeding density is shown in *Table 4*.
In the case of Pamela variety, the secondary branches are in a large number in variants sown in a larger number of germinable seeds per square meter.
From data analysis it is found that in Extend hybrid, the average number of secondary branches is reduced with increasing seeding density.
In Exotic hybrid, the maximum average number of secondary branches is done in variants sown at 100 g.s./m² (17.43 secondary branches per plant).
In PR46W14 hybrid, the maximum number of secondary branches per plant is obtained at seeding densities of 100 and respectively 150 g.s./m², 22.1 respectively 22.5 secondary branches per plant.

**Table 4. Average number of secondary branches/plant in the four rapeseed cultivars in 2011**

| Cultivar | 50 g.s./m$^2$ | 100 g.s./m$^2$ | 150 g.s./m$^2$ | 200 g.s./m$^2$ |
|---|---|---|---|---|
| **Pamela** | 9.27 | 10.63 | 20.80 | 14.70 |
| **Extend** | 23.37 | 17.43 | 16.37 | 10.83 |
| **Exotic** | 16.77 | 17.43 | 17.00 | 16.90 |
| **PR46W14** | 9.37 | 22.10 | 22.55 | 15.37 |

Average number of capsules per plant in the four cultivars in 2011 is shown in *Table 5*. and is an important element of productivity.
Data analysis shows that the average number of capsules per plant in Pamela variety has the highest values in the version that rape is sown at density of 150 g.s./m² - 323.7 capsules/plant.
Highest average number of capsules per plant in Extend hybrid is realized in the variant sown at 50 g.s./m² (415.17 capsules). The lowest average number of capsules per plant is obtained in the version sown at 200 g.s./m² - 193.4 capsules.

In Exotic hybrid, the maximum number of capsules is obtained in the version sown at 100 g.s./m² - 288.68 capsules per plant. At a density of 50 g.s./m², the average number of capsules per plant is only 259.53.
In PR46W14 hybrid is found that at the density of 100 respectively 150 g.s./m² it is realized the largest number of capsules the plant.

**Table 5. Average number capsules/plant in the four rapeseed cultivars in 2011 under the influence of seeding density**

| Cultivar | 50 g.s./m$^2$ | 100 g.s./m$^2$ | 150 g.s./m$^2$ | 200 g.s./m$^2$ |
|---|---|---|---|---|
| **Pamela** | 202.47 | 251.36 | 323.70 | 251.73 |
| **Extend** | 415.17 | 285.33 | 251.36 | 193.40 |
| **Exotic** | 259.53 | 288.68 | 202.03 | 195.68 |
| **PR46W14** | 140.87 | 337.33 | 219.80 | 205.77 |

## CONCLUSIONS

Research results obtained in 2011 in bifactorial experience from SCDA Lovrin allow the formation of some very important conclusions for rape cultivation.
Seeding density plays an important role for increasing productivity and forming productivity elements.
Growing rapeseed (varieties / hybrids) react differently to seeding density.
Plant height is influenced by seeding density. With very few exceptions (Extend hybrid), plant height increases with increasing seeding density.
The number of branches is strongly influenced by seeding density and implicitly by plant density.
There are hybrids in which the number of main branches increases with density when it is 100 or even 150 g.s./m² (Pamela variety). In Extend hybrid, the highest branching is realized at a density of 50 g.s./m².
Firm conclusions about the influence of density on growth and development of productivity elements will be made only after analyzing the results obtained in the last years of the experimental cycle.
Number of capsules per plant, an important element of productivity, is strongly influenced by seeding density.
The cultivars investigated in terms of the number of capsules per plant, are influenced differently by seeding density.

## ACKNOWLEDGEMENTS

This work was published during the project “DOCTORAL STUDIES FOR RESEARCH IN TRAINING", POSDRU /107/1.5/S/80127, co-financed by the European Social Fund through the Sectorial Operational Programme for the Human Resources Development 2007-2013.

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